GRENADA

REPORT

ON THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR

1958

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DEPARTMENT OF AGRICULTURE,
ST. GEORGE'S,
GRENADA.

THE HONOURABLE MINISTER FOR PRODUCTION AND LABOUR,
MINISTRY OF PRODUCTION AND LABOUR,
ST. GEORGE'S.

SIR,

I have the honour to submit the annual report of the Department of Agriculture for the year 1958.

The format of this report has been altered from that of previous years as a result of efforts to produce a report which should be more informative and attractive to the reader than previous reports released by this department.

G. A. SOUTHWELL,
Acting Superintendent of Agriculture.
3rd January, 1960.

POLICY.

The Department of Agriculture in the Ministry of Trade and Production is responsible for the implementation of programmes operating under policy dedicated to increased and efficient agricultural production in Grenada and Carriacou.

At this time considerable efforts are continuing with rehabilitation of farms damaged or destroyed by hurricane 'Janet' in 1955. The immediate goal is to raise overall production to at least the pre-Janet level with particular emphasis being paid to the export crops—cocoa, nutmegs, bananas and cotton. The long term goal is increased agricultural production through new development to provide the expanding economic base essential to a rising standard of living and increasing population pressure. Focal points of rehabilitation and development are the Central Nursery at Mirabeau and the various cocoa stations for propagating clonal cocoa together with a reorganised and expanded extension service.

TABLE OF CONTENTS.

FOREWARD .. .. .. Page (i)

POLICY .. .. Page (ii)

REPORT OF THE DEPARTMENT Paragraphs.

SECTION I Weather Conditions .. .. 1—3

SECTION II Production

—Cocoa .. .. 4—5

—Nutmeg and Mace .. .. 6—11

—Banana .. .. 12—17

—Sugar, Molasses and Rum .. .. 18—23

—Copra and by-Products .. .. 24—26

—Minor Crops : Limes, Cotton, Coffee, Pineapple .. .. 27—30

—Foodcrops .. .. 31—

—Miscellaneous Fruit Trees .. .. 32—

—Livestock : Cattle, Hogs, Sheep, Poultry .. .. .. 33—41

Pastures .. .. 42—

Meat and Milk .. .. 43—46

—Fish .. .. 47—48

—Forestry Products .. .. 49—51

SECTION III WORK IN THE DEPARTMENT.

—Extension Service .. .. 52—58

—Soil Conservation .. .. 59—

—District Agricultural Stations .. .. 60—

Westerhall .. .. 61—68

Mt. Moritz .. .. 69—76

Tivoli .. .. 77—78

—Botanic Gardens .. .. 79—80

—Specialist Services :

Cocoa Industry Improvement Scheme .. .. .. 81—

The Clonal Trials .. .. 83—106

Plant Propagation .. .. 107—113

Plant Distribution .. .. 114—119

Cocoa Rehabilitation Board .. .. 120—

Hurricane Recovery Nursery (Mirabeau) .. .. .. 121—

Plant Propagation .. .. 122—127

Plant Distribution .. .. 128—

Nutmeg Propagation .. .. 129—136

Bananas .. .. 137—139

Plant Protection .. .. 140—153

Paragraphs.

Land Use .. .. 154—157

Land Settlement .. .. 158—164

Livestock .. .. 165—

Artificial Insemination .. .. 165—

Veterinary .. .. 166—167

Forestry .. .. 168—174

Fisheries .. .. 175—

SECTION IV Carriacou .. .. 176—

Weather 176

Agricultural Production

Crops .. .. 177—181

Livestock .. .. 182—

Work in the Department .. .. 183—189

SECTION V Visitors.

SECTION VI Staff.

SECTION VII Appendix.

SECTION I.

Weather Conditions.

1. *Rainfall.*—Monthly and annual rainfall, 1958, at all recording stations are given in Appendix I. Calliste experienced the lowest rainfall, 36.56 ins., while the highest, 168.72 ins., was recorded at Grand Etang.

2. Rainfall returns for the Department's recording Stations 1958, and 1948—1957 are hereunder :

Station.	Period	
	1958	Average for 1948—1957
1. Botanic Gardens	72.68	84.13
2. Westerhall Agricultural Station	61.20	65.52
3. Mt. Moritz	86.47	82.14
4. Tivoli	71.89	75.78
5. Ashenden Cocoa Station ..	107.83	~~98.60~~ 109.56
6. Maran Cocoa Station ..	103.99	104.66
7. Mt. Horne Cocoa Station ..	85.52	88.45*
8. Boulogne Cocoa Station ..	81.03	84.68
9. Grand Etang	168.72	149.62

The year 1958 was slightly drier than a normal year with a marked dry season-February through April.

3. *Highwinds.*—Highwinds during July caused moderate damage to banana cultivations and in conjunction with the severe dry season contributed to a smaller banana crop than was estimated.

SECTION II.

Production.

MAJOR CROPS

4. *Cocoa.*—Cocoa exported was 28,187 cwts., or 55 percent of the 1954 (last pre-Janet) crop. Cocoa exports for the years 1950-1958 are presented below with the dollar value of the crops :—

Year	Export (Cwts.)	Value $
1950 ..	40,227	2,434,634
1951 ..	48,504	3,576,116
1952 ..	54,178	3,537,395
1953 ..	61,128	3,852,773
1954 ..	51,362	4,959,403
1955 ..	47,327	4,158,807
1956 ..	11,400	650,187
1957 ..	23,308	1,387,778
1958 ..	28,187	2,297,468

5. Prices declined steadily during the year from 20 cents per lb. and 66c. per lb., for wet and estate grades respectively to about 15 cents per lb., and 55 cents per lb. by year's end.

6. *Nutmeg and Mace.*—For 1957 and 1958 the quantities of nutmeg and mace delivered to the Grenada Co-operative Nutmeg Association's receiving centres were as follows :—

Nutmeg and Mace	1957 lbs.	1958 lbs.
Cured in shell	400,207	329,663
Uncured in shell ..	1,343,689	1,216,038
Grinders	15,849	7,574
Whole Mace	132,973	111,306
Broken Mace	21,882	21,472

7. The table below shows the quantity and dollar value for exports of nutmegs, mace and nutmeg oil for the years 1950-1958.

Year	Nutmeg (Cwts)	Mace (Cwts)	Nutmeg Oil (lbs)	Total Value ($)
1950 ..	61,947	6,515	6,280	3,976,488
1951 ..	23,152	5,199	5,040	2,199,514
1952 ..	44,607	6,886	3,140	2,334,987
1953 ..	37,082	7,505	10,260	2,328,894
1954 ..	48,881	7,439	4,050	2,935,227
1955 ..	52,887	6,478	6,570	2,934,609
1956 ..	35,626	1,169	2,385	3,946,701
1957 ..	3,329	1,308	—	1,774,837
1958 ..	13,017	1,363	—	4,542,659

* Only 1953–1957.

8. Export for 1958 shows the first upward trend since Janet and was approximately 26 per cent of the last pre-Janet year, 1954. Annual production is not expected to increase significantly during the next four years. After 1962, post-Janet plantings should contribute to marked increases in nutmeg and mace production.

9. Despite the very small crop by pre-Janet standards, the industry earned more dollars than any other single export crop due to the very high prices paid on the overseas markets. Sound unassorted nutmeg fetched about $3.12 per pound and defectives about $2.16 per pound. Top grade mace remained fairly steady at $5.28 per pound whereas inferior grades fluctuated between $3.60 and $4.80 per pound. It is expected that prices will decline steadily from 1959 onwards.

10. During the year the advance prices being paid were steady at :—

Uncurred Nutmeg	25 c. per lb.	Whole Mace	$1.20 per lb..
Cured Nutmeg	38 c. per lb.	Broken	.60 per lb.
Defectives	12c. per lb.	Siftings	.30 per lb.

11. In 1958 the Grenada Co-operative Nutmeg Association in conformity with established practice released an end of year lump-sum or bonus payment to producers; this money is met from the difference between advance and final payments on nutmeg and mace.

12. *Bananas.*—In 1958 just under one million stems of bananas were shipped to the United Kingdom. Banana export figures and the dollar value of crops for 1953-1958 are given below :—

Year	Stems Exported	$ Value
1953 ..	49,863	51,089
1954 ..	108,900	189,237
1955 ..	92,243	139,500
1956 ..	67,115	138,500
1957 ..	568,841	1,387,778
1958 ..	947,893	1,752,340

Figures for 1958 show an increase of 374,052 stems on exports for 1957. This achievement, though slightly below the anticipated, was encouraging. The 1959 crop is estimated at 1.25 million stems.

13. Banana exports in 1958 weighed 11,715.76 tons with an average weight of 27.7 lbs per stem as compared with 30.8 lbs. in 1957. The reduction in weight per stem (3.1 lb.) is considerable and should be viewed with some alarm for if the average weight per stem falls at 2-3 lbs. per annum, then in about four years most stems offered for export would not satisfy the minimum weight of 18 lbs. per tem. A total of 38,915 stems or 3.9 per cent of all fruit offered was rejected.

14. In January the f.o.b. price of bananas was 6.25c. per lb.; it climbed slowly to a high of 7.78c. in June and remained fairly constant until late October after which prices fell sharply to 4.03c. in December.

15. Geest Industries, buyers of Windward Islands Bananas, introduced packing of stems in paper wrappers, first in Dominica and later in Grenada. Shipping in wrappers began in Grenada on a small scale during December. It is hoped eventually to ship all Lacatan bananas in paper wrappers.

16. An important feature was the marketing of 92,690 stems by 19 Farmers' Clubs and Marketing Societies representing small producers. Export by these Farmers' Organizations was valued at $136,668.43 or nearly 8 per cent of the value of the island's banana export.

17. Opportunity is taken here to comment on the role of bananas in the economy of Grenada. Banana is vital to the economy by virtue of its rapid maturity which allows a quick return on capital, by virtue of its use as a nurse crop for the other major exports crops, cocoa and nutmeg, by virtue of its high potential economic return per acre, by virtue of the regularity of shipments which provides producers, farm labour and truckers with regular incomes and by the general stability resulting from increased diversity in crops for export.

18. *Sugar, Molasses, Rum.*—Production of sugar and tons cane per ton sugar at the Grenada Sugar Factory Ltd., for 1950-1958 are presented below :—

Year	Sugar Produced Tons	Return Tons Cane/Tons Sugar
1950 ..	1,687	10.31
1951 ..	2,779	11.94
1952 ..	1,929	11.11
1953 ..	2,108	10.58
1954 ..	2,527	10.43
1955 ..	2,470	9.65
1956 ..	1,403	11.20
1957 ..	2,221	9.87
1958 ..	2,002	10.95

The production of 2,002 tons of D. C. Sugar is 300-400 tons less than local requirements and unfortunately there is every indication that the 1959 crop will be even smaller.

19. Of the 21,925 tons cane milled, estates owned by the factory produced 23.5 per cent, small farmers supplied 54.5 per cent and relatively large holdings contributed 22 per cent. The retail price of D.C. Sugar remained unchanged at 12.5 c. per lb.

20. The major varieties grown are B. 34104, B. 37161, B. 4098, B. 41227 and B. 4744. The drought weather experienced during the reaping season caused much of the crop to dry out excessively and contributed to poor returns.

21. The Plant Protection Division sprayed 300 acres with a mixutre of Dieldrin and Aldrin for the control of froghopper which met with some measure of success. The incidence of borer (Diatraea) infestation was high and this also contributed to lower yields and poor quality juice.

22. In 1957 the Grenada Sugar Factory Ltd., began the exportation of black strap molasses. Quantity and value of exports for 1957 and 1958 are given below :

Year	Molasses (Gals.)	Value ($)
1957 ..	82,634	8,321
1958 ..	37,093	18,422

23. The Grenada Sugar Factory Ltd., and seven distilleries produced 91,798 gallons of White Rum for sale on the local market.

Year	Rum (Proof Gals.)
1955 ..	86,194
1956 ..	80,436
1957 ..	91,395
1958 ..	91,798

24. *Copra and By-Products.*—The factory at Tempe produced 51,118 gals., of refined oil and 305,100 lbs. of laundry soap during 1958. All production including coconut meal was released on the local market. The table below gives production figures for the period 1954 to 1958. For 1958, the ex-factory prices were : oil $3.00 per gallon, soap, $8.80 per box of 50 lbs., and coconut meal, 4 cents per lb.

Year	Refined Oil (Gals)	Laundry Soap (Lbs)	Coconut Meal (Lbs)
1954 ..	24,840*	371,850	286,500
1955 ..	32,028	317,550	245,800**
1956 ..	38,878	68,050	225,480**
1957 ..	27,555	170,800	194,700
1958 ..	51,118	305,100	326,780

25. From the above table it can be seen that in 1958 production of refined oil and laundry soap increased considerably, 85 per cent and 78 per cent respectively over production in 1957.

26. An increase in the acerage under coconut is considered desirable and germinated seed coconuts were made available free of cost to farmers. During the year the price of copra remained unchanged at 11¾ cents per lb.

MINOR CROPS.

27. *Limes.*—Of the total of 1,751 lbs. of lime-oil exported in 1958, 1,080 lbs. were produced in Carriacou. The ravages of Janet were followed by low prices in 1956. Low prices discouraged rehabilitation of this crop, and it will be some years before new plantings come into production and allow a return to pre-Janet yields. Exports of lime oil and lime juice for Carriacou and Grenada combined are presented in the table below :—

Year	Lime Oil (lbs)	Lime Juice (gals)	Total Value ($)
1952 ..	4 018	133 080	92,542
1953 ..	7,068	83,280	99,585
1954 ..	10,270	1,600	64,600
1955 ..	3,631	23,480	33,488
1956 ..	460	33,520	10,786
1957 ..	1,357	19,460	19,599
1958 ..	1,751	38,480	44,868

In 1958 the average price received was $11.93 per lb., for lime oil and 62 cents per gallon for lime juice.

28. *Cotton.*—In 1958 cotton production was 1075 cwts.; the entire crop is produced in Carriacou. For further details see paragraph 177.

29. *Coffee.*—Coffee as a crop is in the establishment phase only. During the year the department distributed about 180,000 seedlings the majority of which was planted as vegetative barriers on the contour and as borders to fields of cocoa and nutmeg cultivations, very little pure-strand coffee is being planted. Reaping of sizeable quantities of berries is not expected until after 1961.

30. *Pineapple.*—Plantings of pineapple are limited to a few areas established in 1957. No additional planting material was available in 1958 and little expansion will be possible until 1959. A crop of approximately 25,000 fruit is estimated for 1959. Indications are that this crop will not acquire significant status unless producers are prepared to market fruit at a price low enough to attract buyers outside the West Indies. Presently, fruit is retailed locally at 8-9 cents per lb., but 5 cents per lb., f.o.b., will have to be accepted by producers if this crop is to expand into the export market.

*In addition 17,408 gals. of crude oil were produced and exported to Barbados.

**Meal produced for one month is not available, an estimated figure based on copra milled was inserted.

31. *Food Crops.*—Corn was in poor supply for most of the year but fair to good quantities of pigeon peas were available most of the year.

Yams were in moderate to fair supply and fair quantities of tannia and dasheen were produced. Only small quantities of sweet potatoes reached market early in the year but production improved later in the year.

Average retail prices of foodcrops for the year under review were :

Crop	Average retail price (St. George's)
Yam	10 cents per lb.
Peas (green in pod) ..	12 „
Peas (dry) ..	26 „
Sweet Potatoes ..	8 „
Dasheen	8 „
Tannias	10 „
Tomatoes ..	44 „
Cabagges ..	30 „
Carrots	44 „
Corn	10 „

Off season prices of foodcrops are usually higher than the averages given above.

32. *Miscellaneous Fruit Trees.*—Mango trees bore very heavily whereas avacado pear was in very short supply. Bluggoes, plantains, breadfruit, soursoup, sapodillas, golden apples and sugar apples were available in fair quantities. Much of the fresh fruit produced is shipped by huxters for the Trinidad market.

Livestock.

33. *Cattle.*—There are indications that slaughter is outstripping replacements and the cattle population is believed to be decreasing. The decrease in numbers is perhaps related to a relaxation of control on the slaughter of females fit for breeding. In order to encourage an increase in the quantity as well as the quality of animals in the island kept by small farmers, Government launched a Herd Revolving Scheme. Under this scheme Government loans a breed heifer or cow to a selected farmer. When a female calf is born this goes to the farmer and Government retains the cow which is bred again and loaned out almost immediately to another farmer.

34. A dozen heifers or cows were purchased and bred at Westerhall Station and the scheme was officially launched by the Minister of Trade and Production during August. Plans are afoot to purchase a further 24 cows under the scheme during 1959. By every indication the scheme is very popular and is assured of success. It is hoped that the Revolving Herd Scheme in conjunction with the well established Artificial Insemination Scheme will effect the desired improvements in quantity and quality of local cattle.

35. With assistance from the Livestock Officer, Baillies Bacolet Estate began the importation of frozen semen (Jersey and Holstein) late in the year. The semen, from proved bulls of the best pedigree obtainable, is secured through Ontario Veterinary College, Canada, and is for use by A.I. on the Baillies Bacolet herd.

36. *Hogs.*—During the year there were no major changes in conditions affecting the pig industry. Efforts aimed at increasing the hog population were in large measure thwarted by the ever existing shortage of cheap concentrates. One breeder imported a Large White boar and sow. Government officially supports adoption of Large Black hogs as the standard for Grenada.

37. *Sheep.*—Sheep is a popular class of livestock with small farmers and the sheep population was maintained. One breeder imported ten Persian lambs from Trinidad. Earlier importations used to be predominately of the Border Leicester breed.

38. *Goats.*—The goat population appears on the increase. British Alpine and Anglo Nubian breeds are the most popular and pedigreed rams are kept for service at the agricultural stations.

39. *Poultry* (*Chickens*).—Poultry rearing, commercially speaking, is limited to chickens. Back yard flocks of 10-20 birds are still the rule; there are only three or four producers with flocks of 500 or more layers and only 10,500 day old chicks were imported in 1958. Local production does not meet the demand and about 57,202 lbs. of frozen chickens valued at $20,885 and 4,602 dozen table eggs were imported in 1958.

40. A poultry club has been in existance for a few years and offers more efficient and large scale producers opportunities to discuss problems and trends. The club plans to encourage increased poultry production by way of the numerous Farmers' Clubs which now exist but the industry has been and is handicapped by high cost imported feeds, lack of cheap cold storage space and central organization and direction. It is realised that significant increase in production cannot be realised without in some measure overcoming the above obstacles to efficient production.

41. The Poultry Multiplication Scheme continued to operate during the year and 3,129 week-old chicks, mostly Rhode Island Reds, were sold at 50 cents each. There were no major outbreaks of disease although deaths from localized outbreaks of coccidiosis were at times high.

42. *Pasture and Fodder Grasses.*—Pangola grass is becoming a popular pasture grass. Guinea grass and Guatemala grass continue to be popular sources of fodder. During the dry season, cane tops bolster the very limited supply of fodder and pasture grasses. Only two or three farms have silos.

43. *Meat.*—No accurate estimate of the quantity of local beef, pork and other meats marketed is available. Butchers retailed cuts at 66 cents per lb., during 1958. Approximately 27,525 lbs., of frozen meat (poultry excluded) valued at $14,889 was imported.

44. *Milk*.—There are three dairies in the island, all three market milk in St. George's but only two supply milk by house to house deliveries. Large quantities of milk are imported annually. In 1958, milk valued at $207.438 (631,090 lbs., condenced milk and 71,011 lbs., milk powder) was imported.

45. Much fresh fluid milk reaches the city by way of peasant milk vendors. Vendor's milk is often of indifferent quality. Many urban homes use imported milk-powdered, evaporated and condensed-in an effort to avoid the uncertain quality of vendor's milk and the high price of dairy milk. Dairy milk is retailed at 18 cents per pint and vendors' milk at 8 cents.

46. A big Milk Week Campaign was conducted 14th-22nd September, under the aegis of the Co-ordinated Extension Services to encourage more consumption of pure milk. The Department conducted a number of demonstrations on the proper milking of cows as its major contribution to the campaign.

47. *Fish*.—Records of fish landings at five major centres on the North and West coasts covering 22 species of fish were kept. Fish landings at the five sites totalled 1,199,434 lbs., in 1958.

48. A total of 956,310 lbs., of salted fish and 281,356 lbs., of other fish products valued at $253,721 and $100,368 respectively were imported in 1958.

49. *Forest Products*.—It is estimated that approximately 200,000 board feet of lumber was produced i.e. production was at the same level as in 1957. Of this, the Duncan Mills, Gouyave, produced about 150,000 board feet.

50. A Government owned woodworking unit was erected near St. George's. This plant, the Timber Development Centre, began operation in October and by year's end 36,314 board feet was converted to dress lumber. No accurate data on pit saw production on private lands are available.

51. The salvaging of wind blown (Janet) timber continued. A total of 14,992 cubic feet of timber estimated to yield about 116,000 board feet of swan lumber valued at approximately $27,800 was extracted from the Government Forest Reserves together with 3,738 cubic feet of posts. Also extracted were 56,064 cubic feet of fire wood estimated to yield about 4,800 bags of charcoal valued at $8,000 and 719 bundles of bamboo. The table below shows production for 1955-1958.

Product.	1955	1956	1957	1958
Post (cubic feet) ...	15,615	9,313	20,903	18,731
Fuelwood (cubic feet) ..	20,640	6,230	42,605	56,064
Bamboo (bundles) ..	848	520	433	719

SECTION III.

Work in the Department.

52. *Extension Service*.—There are 32 officers in the five extension districts ; 28 for the four Grenada districts and four for Carriacou. In the past these officers relied largely on individual contact in the extension process but with the recent establishment of a number of Farmers' Clubs and Co-operative Societies more use is being made of group contacts by way of field days, planned demonstrations and conducted tours.

53. By individual contact method it has always been possible to prepare detailed development programmes for small farms. In an effort to achieve similar active participation in the planned development of large farms the department on prior arrangement with management sends a team of senior officers to an estate and prepares a written development programme. The programme is prepared in collaboration with the District Agricultural Assistant and the owner or manager on whom falls the responsibility for implementation.

54. Another important innovation has been the establishment of a number of 'model plots' of cocoa, nutmeg, and banana on estates. These plots are designed in detail by the department and it is hoped that they will serve as nuclei of development or 'bridgeheads' on approved patterns.

55. During the year considerable effort was directed towards the proper maintenance of 'key farms'. These are holdings under 10 acres owned by leaders in their respective communities and now as in the past serve as models of desirable small farm development.

56. The year saw the creation of a loosely organized Co-ordinated Extension Service. A number of government departments with established extension divisions agreed to undertake jointly big projects at the community or even island wide level.

57. The first project, and incidentally the only one attempted in 1958, was an island wide Drink-More-Milk Campaign which culminated with a Milk Week in September. The staff of the Department of Agriculture assisted by running a number of demonstrations to show proper milking methods. This department also assisted with poster displays and radio broadcasts. The Milk Drive was widely acclaimed a success.

58. A highlight of the year was the extension seminar at the Botanic Gardens, October 6th-10th. This seminar was sponsored by I.C.A. of the U.S.A. and the entire extension staff of the Agricultural Department and a few officers from the Education Department attended. The work shop method was used by the siminar leaders to teach the rudiments of programme planning. Considerable emphasis was laid on visual aids, their preparation and use including film strips, flip charts, the silk screen reproduction process and development of color films. The Department of Agriculture is greatly indebted to I.C.A. for organizing and running the seminar which has without doubt contributed to an improved extension service.

59. *Soil Conservation.*—A total of 954,700 feet of lines were laid down during the year for the establishment of graded drains, head drains, runoff drains, vegetative barriers, stone barriers and for barriers along the banks of gullies and rivers. The extension staff has continued encouraging farmers to make use of assistance available under the Soil Conservation Grant administered by the Central Agricultural Rehabilitation Committee. Footage lined for barriers or drains by agricultural districts were : North 261,500 ft., South 264,300 ft., East 281,600 ft. West 147,300 ft.

DISTRICT AGRICULTURAL STATIONS AND BOTANIC GARDENS.

60. There are three district agricultural stations: Westerhall (South), Mt. Moritz (West), and Tivoli (North) and the Botanic Gardens at Tanteen St. George's.

WESTERHALL AGRICULTURAL STATION

61. This is the livestock station of the Department. In addition to cattle, hogs, sheep, goats, and poultry a few fields of foodcrops are maintained. In 1958, small plots of corn, peas, yams and cassava were grown.

62. *Cattle.*—The Station's herd of 30-45 animals was maintained in good health. On 31st December, the composition of the herd was as follows :—

Bulls ..	4
Cows ..	8
Heifers ..	6
Steers ..	1
Calves ..	11
Total	30

Births :—Nine calves were born during the year.

Deaths :—The Red Poll bull "Knepp Conrad" died. A replacement will be imported from the United Kingdom during 1959.

Sales :—Four bulls and one cow were sold.

Milk :—A total of 9,365 quarts of milk was produced, of which 4,445 quarts were sold as fresh whole milk and 2,562 quarts were converted to butter. The remainder was fed to calves, pigs and goats on the station.

63. *Hogs.*—The herd of Large Black hogs was maintained in good health. A total of 170 piglets were born and 29 died. Two young boars were imported from the United Kingdom and 132 animals were sold.

At year's end the composition of the herd was as follows :

Boars ..	3
Sows ..	18
Gilts ..	5
Barrows ..	—
Piglets ..	43
Total	69

Twenty one (21) litters were born in 1958 with an average of 8.0 piglets per litter. The average number of piglets weaned per litter was 6.6.

64. *Goats.*—Four British Alpine ewes and a buck were maintained on the station.

65. *Sheep.*—One South African Woolless ram was kept. Six sheep were transferred to Limlair Agricultural Station, Carriacou.

Poultry :—(Poultry Multiplication Scheme).

66. Pens of birds of two breeds, Rhode Island Reds and Barred Plymoth Rock, were maintained for breeding purposes under the Poultry Multiplication Scheme.

At year's end the station's flock comprised :—

Roosters	7
Hens ..	—
Pullets ..	180
Cockerels	19
Chicks ..	—
Total	206

Eggs.—	Production : Eggs on hand 1st January, 1958	133
	,, layed 1958	16,250
	Total	16,383

Disposal :	Eggs incubated	9,331
	„ used by A. I. Scheme ..	221
	„ broken	676
	„ sold	5 772
	„ on hand 31st December, 1958	383
	Total	16,383

67. *The Brooders.*—The incubator attached to the Poultry Multiplication Scheme is housed in the Botanic Gardens. The percentages of infertile eggs and dead germs were high, 24 percent and 25 25 percent respectively. The high percentage of dead germs was caused in large measure by the numerous electrical power failures. Only 4,604 eggs hatched. Of the 676 broken eggs listed in the table, 337 were sold as cracked at 6 cents each.

68. *Pastures.*—The following grasses were grown on the station : Pangola, Guatamala, Guinea, Coastal Bermuda and Sugar Cane. Gautamala and cane were cut and ensiled in October.

MT, MORITZ AGRICULTURAL STATION

69. Mt. Moritz Agricultural Station is traditionally associated with food crop production in Grenada.

70. *Orchard Crops.*—Small plots of cocoa, citrus, banana and coconuts were maintained. A number of coffee seedlings were planted as vegetative hedges marking boundaries of the various orchard plots.

71. *Foodcrops.*—Yields from plots of pigeon peas and corn were fair to good. Yams yielded poorly whereas sweet potatoes bore well but were heavily damaged by rats. Plots of cassava and chinese eddoes were established and were in good condition by year's end.

72. *Green Vegetables.*—Poor yields were obtained from all vegetables except cabbage which yielded fair.

73. *Experiments.*—A sweet potato variety trial (randomized blocks) was harvested in May but the severe drought in February through April and heavy attacks by rats so affected yields that no routine analysis was possible. Another trial was planted in September and at the end of the year all blocks were in very good condition.

74. A fertilizer trial (3 x 3 x 3 factorial) on yams was abandoned.

75. Following an island wide search, ten varieties of pigeon peas were selected for establishment in a plot and notes were taken on growth characteristics. Seeds from self-pollinated plants were collected and sent to the plant breeder at I.C.T.A. The sweet potato variety experiment and the pigeon peas observation trial are part of a new research programme on local foodcrops carried out in collaboration with Regional Research Centre at I.C.T.A.

76. *Livestock.*—One heifer calf was borne and one bull calf and a cow died. On 31st December, seven animals were on hand : 2 cows, 2 calves, 1 buck, 1 boar and 1 ram. The boar, buck and ram are maintained for service. Services for the year were :

Boar ..	12	services
Buck ..	16	„
Ram ..	2	„
Total ..	30	

TIVOLI AGRICULTURAL STATION

77. *Crops.*—Small plots of banana, clonal cocoa, pineapple, corn and pasture grass were maintained.

78. *Livestock.*—The Station's Stud Centre provides one bull, one boar, one buck goat, and one ram sheep for service. During the year the buck goat was sold (old age) but was not replaced. An old cow and a bull calf were sold; only one cow was maintained throughout the year.

BOTANIC GARDENS

79. During the year the Botanic Gardens was maintained in fair condition. A motor mower was secured about mid-year and has assisted considerably with the proper preparation of the lawns. However, the gardens continue to suffer from a lack of adequate funds. No renovations were undertaken but limited rehabilitation is planned for 1959.

80. A total of 1,250 ornamental plants were sold or distributed free.

SPECIALIST SERVICES.

Cocoa Industry Improvement Scheme.

81. *The Investigational Programme.*—The year 1958 saw yet another milestone in the history of this programme. The clonal trials at Ashenden and Mt. Horne, and to lesser extent Maran, have continued to make satisfactory progress in terms of growth and yields. With regard to the latter there was every indication that the pre-hurricane crop yield (1954-55) was surpassed. Mention was made in the 1957 report of the negligible and sometime negative response to treatments in the cultural and manurial trials. A new approach was therefore given to this problem in that all the overhead shade was eliminated during the rainy season of 1958 and the fertiliser treatments were given in two equal applications—one at the beginning of the rains—the other just prior to the ending of the rainy season.

82. Of the experiments conducted on private estates the progress in many instances has been gratifying and yield analyses have been made of the more advanced ones.

83. *The Clonal Trials.*—The year under review marked the tenth year of these experiments which were planted in 1948. It would be unwise to say that recovery from 1955 hurricane is complete but if clonal performances is any indication of this, there is evidence that the pre-hurricane yields have been surpassed or nearly so.

84. At Ashenden where at the time of writing the clonal analyses have been completed, the following clones have yielded at the rate of over 2,000 lbs. dry cocoa per acre—G.S. 29, 36, 40, 57, whilst the following have recorded yields between 1,500 lbs.. and 2,000 lbs.. - G.S. 1, 3, 17, 19, 26, 46, 48, 53, 65, 69, 71, 76, 78.

85. Cultural operations carried out during the year comprised : weeding, regulation of shade, staking, pruning and cleaning contour drains. Because of peculiar ecological conditions at Maran, the overhead Gliricidia shade has not yet been eliminated. Immortelle seedlings have been planted throughout the experiment and as soon as these are sufficiently established this would be done.

86. The annual fertiliser application was made on all three stations with slight amendments ; the normal quantity of fertilizer applied per tree was split in two applications.

Rate per Application :

Mt. Horne :—Rep. 1x—1 lb. 12 : 8 : 24 N.P.K. Mixture per tree
+ ¼ lb. Triple Superphosphate.
Rep. 2x—1 lb. 12 : 8 : 24 : N.P.K. Mixture per tree
+ ¼ lb. Sulphate of Ammonia.
Rep. 3Y—1 lb. 12 : 8 : 24: N.P.K. Mixture per tree.
Rep. 4Y—1 lb. 12 : 8 : 24 : N.P.K. Mixture per tree
+ ¼ lb. Sulphate of Potash.

Dates of 1st application 1st July, 1958, 2nd application 5th December, 1958.

Ashenden :— Rep. 1x—1 lb., 12 : 12 : 21: N.P.K. Mixture per tree
+ ¼ lb. Triple Superphosphate,
Rep. 2x—1 lb. 12 : 12 : 21 : N.P.K. Mixture per tree
+ ¼ lb. Suphate of Potash.
Rep. 3Y—1 lb., 12 : 12 : 21 : N.P.K. Mixture per tree.
Rep. 4Y—1 lb. 12 : 12 : 21 : N.P.K. Mixture per tree
+ ¼ lb. Suplphate of Ammonia.

Dates of 1st application 8th July, 1958 and 2nd application 11th December, 1958.

Maran : Rep. 1X—1 lb. 12 : 8 : 24 : N.P.K. Mixture per tree
+ ¼ lb. Sulphate of Potash.
Rep. 2Y—1 lb. 12 : 8 : 24 : N.P.K. Mixture per tree
+ ¼ lb. Sulphate of Ammonia.
Rep. 3Z—1 lb. 12 : 8 : 24 : N.P.K. Mixture per tree.

Dates of 1st application 27th June, 1958, 2nd application 2nd December, 1958.

87. This differential manuring in replications was suggested by Mr. F. W. Cope of the Regional Research Centre, Trinidad and it would be interesting to see how it is reflected in actual yields.

88. *Pest and Disease Control.*—The incidence of pests and diseases was low. There were very few recorded instances of beetle attack or Witches' Broom occurence. Minor attacks of Thrips and mealy bugs were successfully controlled with Dieldrin and Albolineum. At Maran the Mealy Bug-Black Ant association, causative agents for Black Blight on Gliricidia and clonal trees still continues to be a problem. Mixtures of Malathion and Albolineum have not been able to give 100 per cent control. A hopeful solution is elimination of the Gliricidia shade when the recently planted Immortelle becomes established.

89. *The N.P.K. Manurial Trials.*—(3x2x3 partially confounded randomized blocks. G.S. Clones 32, 76, 33). These experiments located at Maran and Mt. Horne were planted in 1949 and 1950. The 9th and 8th manurial treatment respectively were given during the year in two equal applications. The rates of applications per treatments are shown in the following table :—

Sulphate of Ammonia			Triple Super-phosphate		Sulphate of Ammonia	
N 0	N 1	N 2	P 0	P 1	K 0	K 1
ozs.	ozs.	ozs	ozs .	ozs	ozs	ozs
—	13⅓	26⅔	—	10	—	13⅓

90. Routine operations carried out in these trials during the year consisted of : weeding, pruning, shade regulation, staking and cleaning contour drains; minor attacks of thrips were controlled with Dieldrex.

91. The 1957-58 crop analysis of the Mt. Horne N.P.K. trial failed again to reveal any significant differences between treatments. There was a slight indication (5 per cent level of significance) that double nitrogen in the presence of potash could possibly give a slight increase in yield. Clonal differences as to be expected, were highly significant—G.S. 76 being significantly better than G.S. 32 and G.S. 33, but this did not suggest a treatment response.

92. The shade in both experiments has now been removed as this was thought to be masking the fertiliser responses. Future yields analyses should reveal whether this has been so or not.

Pen Manure vs. its N.P.K. Equivalent with extra Nitrogen Trials.—(2x2x2 partially confounded randomized blocks, G.S. 76, 56, 32).

93. These experiments were planted in 1950 at Mt. Horne and Ashenden. The sixth application was made in the year under review, at the rate of thirty-two (32) tons pen manure per acre with its N.P.K. equivalent and extra nitrogen. This amount represents the theoretical maximum which might be applied by an estate and is to be repeated every four years. This interval might have to be reviewed at some later date in the light of visible evidence of unsatisfactory clonal performance.

94. The complete pen manure, N.P.K. equivalent and extra Nitrogen treatments were given in two equal applications.

Table of Application per Tree.

Rate of application per Treatment :

	Extra N	N.	P.	K.	Pen Manure	K added to Pen Manure
	ozs.	ozs.	ozs.	ozs.	lbs.	ozs.
Mt. Horne ..	8	14	1.95	3.7	66.5	9
Ashenden ..	8	23.5	3.75	7	66.5	9

95. The shade in both experiments has been eliminated since as in the case of the N.P.K. trials it was suggested that the treatment effects might have been masked by the dense overhead shade. At the time of writing the 1957-58 crop has not yet been analysed for either experiment, but if cause and effect can be correlated, certain plots in the trial at Ashenden have obviously responded to the reduced shade whilst others have taken on an unthrifty appearance.

Forking, Mulching and Forking-in-Mulch Trials :—(4x2x2 Randomized Blocks, G.S. 56, 73, 32, 5 at Mt. Horne and G. S. 11, 29, 36, 32 at Carriere Estate).

96. *Mt. Horne.*—The eighth mulch application was made in May to the experiment on this station. As usual, this consisted of a mixture of Elephant and Guatemala grass applied green to each "M" and "MF" plots at the rate of 1,000 lbs. per plot. In September, after decomposition was fairly advanced the "F" and "MF" plots were forked. The seventh application was made in 1957 and since two consecutive applications are regarded as a complete treatment, forking follows the second application.

97. Besides mulching, the following routine practices were carried out :—weeding, pruning, eliminating shade and cleaning contour drains, minor attacks of thrips were controlled with Dieldrex insecticide.

98. *Carriere Estate.*—The fourth mulch application was made to this experiment in September. The "M" and "MF" plots received a mixture of Elephant and Guatemala grass at the rate of 1,000 lbs. per plot. Forking the "F" and "MF" plots was effected as soon as partial decomposition of the mulches began.

99. Both the growth and yields of the trees in this experiment have been extremely good and an attempt was made to analyse the 1956-57 crop yields. The overall effect of mulching was significant. Clones G.S. 29 and 36 showed a slight positive response to mulching and a negative response to forking. However the poorer clones (G.S. 32 and 11) seem to favour straight forking as well as forking-in-mulch. As this was the first crop year to be analysed it would be interesting to see whether these results persist from year to year.

100. Routine maintenance work carried out in both experiments consisted of pruning, relabelling, staking, eliminating shade and cleaning contour drains. Attacks of thrips, mealy bugs and beetles were controlled with frequent applications of Dieldrex and Albolineum.

101. *Liming and Manurial Trial .*—(2x2x2x2 factorial) planted 1954 at Hope Estate, St. Andrew's. This experiment was designed with the specific aim of lending confidence and stability if necessary to the practice of liming in Grenada.

102. The first application of burnt lime at the rate of 10 lbs. per tree was applied in October 1957 and forked into the soil. Fertilisers were applied to the appropriate plots on the 6th August, 1958, at the following rates per tree :—Sulphate of Ammonia 2 lbs. Triple Superphosphate 1 lb., Sulphate of Potash 1 lb. Prick forking followed in all the treated as well as the control plots, but guard row trees were not forked.

103. Accurate yield records are being kept and as soon as this experiment is cropping freely, yield analyses will be made.

104. *Estate Clonal Trials.*—These experiments are situated as follows :—Two at Carriere Estate, and one each at Grand Bras, Hope and LaTaste Estates. Carriere No. 1 planted 1953, Grand Bras planted 1953, LaTaste planted 1953, Carriere No. 2 planted 1954, Hope planted 1954.

105. Of the three planted in 1953, the No. 1 trial at Carriere is cropping freely and yield analyses have been made. The 1956—57 crop year revealed no significant difference between I.C.S 39, 60 and G.S. 36, 29. In 1957-58, I.C.S. 39 yielded significantly better than all other clones.

106. At LaTaste where conditions are not as uniform as in the Carriere No. 1 Trial, no significant differences between clones were obtained over the entire period 1956-1958, however, the block differences, as to be expected, were significant.

Plant Propagation.

107. *Cuttings' Gardens (Nurseries).*—These were extended at the Mirabeau Agricultural Station.

108. *Production of rooted Cocoa Cuttings.*—The table in Appendix II shows detailed statistics from which the propagating efficiency has been computed.

109. The overall propagation efficiency for the stations increased slightly from 48 per cent in 1957 to 50 per cent in 1958. The efficiency of the Boulogne Station increased from 48 per cent in 1957 to to 54 per cent in 1958.

110. Although the propagation efficiency only increased by 2 percent, there has been an increase of 91,000 plants produced over the 1957 figure, an increase of 35 per cent from the same area of propagation bin space. This clearly demonstrates that propagation efficiency should be related to the maximum number of cuttings that can be set per given area of bin space per annum, which in turn depends on the method of propagation.

111. *Estate Propagators.*—During the year nine estate propagators were in operation under the assisted subsidy scheme. These estate propagators were operated on the following estates : Carriere, Gouyave, Brothers, Dougaldston, LaSagesse, Waltham, Annandale, Mt. Nesbit and Bonaire.

112. Estate propagators produced a total of 39,928 plants during the year.

113. *Production of budded plants.*—A total of 23,329 seedlings were budded and potted during the year. The lifting technique was improved which resulted in reducing losses after lifting and potting. A large number of budded plants were potted in diothene pots. The following table shows the number of stocks budded and the number and percent of buds taken :—

No. of Stocks Budded	Buds Taken	
	No.	percent.
23,329	17,547	75

114. *Plant Distribution.*—The following table shows the number of rooted cocoa cuttings distributed during the year; comparative figures are given for 1957.

	Nurseries	Supplies or Replacements	Originals	Total No. of Rooted cuttings Distributed
Boulogne ..	7,532	2,859	130,305	140,696
Ashenden ..	1,992	2,306	62,381	66,679
Maran ..	2,145	684	41,287	44,116
Estate propagators ..	—	—	16,384	16,384
Totals 1958 ..	11,669	5,849	250,357	267,875
Totals 1957 ..	15,765	9,288	230,834	255,887

The total number of plants distributed exceeded the estimate of 250,000 rooted cocoa cuttings by 17,875.

115. A total of 18,051 budded plants were distributed which increases the number of cocoa plants distributed to 285,926.

116. From the records 250,357 rooted cuttings and 18,051 budded plants totaling 268,408 plants were utilized in new commercial plantings at an average of 360 trees per acre; an area of approximately 745 acres was planted during the year.

117. At the end of 1957 a total of 1,820 acres of clonal cocoa had been planted in the island. Assuming that a total acreage of 250 was lost as a result of the hurricane of 1955, due to landslides and areas not replanted, the total estimated acreage planted in clonal cocoa at the end of the year under review is 2,315.

118. *Applications for rooted cocoa cuttings.*—A total of 2,224 applications were received from farmers for 1,684,059 rooted cocoa cuttings, the equivalent of 5,613 acres for planting in 1959.

119. *Exchange of clonal and other material.*—During the year budsticks of the more promising G.S. clones were forwarded to the United States Plant Introduction Station, Coconut Grove, Florida.

120. *The Cocoa Rehabilitation Board.*—One meeting was convened during the year; the main topic of discussion was the draft estimates of revenue and expenditure for 1959.

121. *Hurricane Recovery Nursery Scheme.*—The propagation of a variety of plants other than cocoa continued and was expanded at the Mirabeau Agricultural Station. By the end of 1958 at least 65 acres of the 77 acres at Mirabeau Station were under cultivation to nursery crops or grass fields. Clearing and the initial preparation of land were carried out by equipment of the Farm Machinery Service.

122. *Plant propagation.*—The dry season experienced in February, March and April, adversely affected the plant propagation programme. The water supply was very often inadequate and a number of plants died. This also retarded the growth and development of young seedlings.

123. A total of 112,848 citrus seedlings were transplanted from seed beds to budding beds. Due to the slow growth a large number of these seedlings were transplanted late in the year, and some of these plants which shall be budded in July 1959, may have to be carried over for distribution in 1960.

124. Some 103,846 and 16,694 tall and dwarf coconut plants respectively, received from St. Lucia and St. Vincent, were sown in the nurseries during the year.

125. A total of 31,600 mango seedlings were transplanted to budding beds during the year.

126. The department imported 4,400 pounds of Robusta Coffee 'cherry' from the Cocoa Board of Trinidad for sowing in nursery beds at Mirabeau Agricultural Station. The coffee seedlings on germination were transplanted into small plastic bags as soon as the cotyledons appeared above soil level. The seedlings were distributed when the plants attained a height of about ten inches. Losses in the field were reduced considerably by adopting this method of distribution compared to the bare root system of distribution, carried out the previous year. Growth and development of the plants were also enhanced.

127. During the year the following plants were budded :—

Type of Plant	No. of Stocks Budded	Buddings Takes No.	Takes %
Citrus ..	70,986	61,206	86
Mangoes	8,439	7,343	87
Pears ..	2,065	1,811	88
Total ..	81,490	70,360	86

128. *Plant Distribution.*—The following plants were distributed during the year :—

Crops.	
Citrus :	
Limes	34,390
Orange Varieties ..	19,898
Grapefruit Varieties ..	11,188
Other Varieties	3,859
Total	69,335
Mangoes :	
St. Julien	520
Ceylon	505
Peach	94
Graham	190
Total	1,309
Avacado Pears :	
Budded Varieties	966
Coconuts :	
Tall Varieties	43,473
Dwarf Varieites	13,764
Total	57,237
Coffee :	180,000
Miscellaneous Plants ..	573
Total number of plants distributed ..	309,420

NUTMEG PROPAGATION.

129. *Rooting of Stem Cuttings.*—Many variations of the normal method were carried out but results so far are not very encouraging. The rooting per cent is extremely low and the period taken for roots to develop varies between three and five months.

A large number of the cut ends of the cuttings rotted. This may have been due to the progressive breaking down of the fibrous rooting medium over the long rooting period, resulting in unfavourable air moisture relationship in the medium. Some rooted cuttings were planted in the field for observation.

130. *Marcotting or Aerial Layering.*—During the period under review 39,000 nutmeg twigs were marcotted, and 3,473 rooted marcots were potted. A total of 749 plants were successfully hardened off and 412 marcotted plants were planted in observation plots on estates.

131. It must be explained that the above figures bear no relationship to one another, for instance, the greater number of marcots done for the year will only root and be severed from the parent plants in 1959.

132. The final efficiency of propagation by this method is still very low and is in the region of 30 percent. It is difficult to assess all the contributing factors to this low efficiency, but some of the chief causes are breaking—off of the marcots on the trees due to high wind velocities, lack of suitable materials for marcotting, insect attack of the rotting medium and losses during the hardening stage which may be caused by excessive watering which results in the rotting of the roots. Investigations are underway to try to eliminate the factors which cause this low efficiency.

133. The technique adopted for marcotting is similar to that described by H. Evans in the 1945-1951 Report on Cocoa Research at the Imperial College of Tropical Agriculture, but with minor modifications.

134. It takes a period of four to six months for roots to develop on the marcotted twig and sometimes as long as nine months. A range of rooting hormones have been tried and the one which has so far given the most promising result is "Seradix" L. 15, which is a 1.5 percent preparation of b-indolyl butyric acid in powder form produced by May & Baker Ltd.

135. *Approach grafting.*—Preliminary trials of approach grafting of seedlings on to twigs of female nutmeg trees were carried out with very encouraging results. Young nutmeg seedlings were collected in the field, potted out in a rich medium and grafted on to a twig of similar size on a female tree. The union is completed within a period of three to five months. The twig of the female tree is severed below the union, and the seedling stock is cut-off above the union, and the grafted plant is placed in a closed bin for four weeks to be hardened-off. Large scale trials of this method are now in progress.

136. Some of the marcotted plants which were planted in the field in August 1957 have commenced flowering and have produced a few nutmegs pods within a period of fifteen months.

BANANAS.

137. *Distribution of plants.*—Whenever possible, the Department continued to supply needy farmers with banana suckers, and distributed a total of 110,600 banana plants during 1958. There were no importations of suckers but 100,850 Lacatan plants were purchased locally and distributed. Only 1,150 banana plants were redeemed for redistribution under the 'sucker for sucker scheme' while a further 8,600 were released from the banana nursery at Mirabeau Station.

138. *Demonstration plot.*—Banana demonstration plots were established on six (6) estates. The planting distance used in all plots was 13' x 6.5' x 3' (twin rows) and growth was good. The twin row layout was used in an effort to develop a planting system which will facilitate easy and rapid spraying by gangs and yet produce a high yield of bunches for export.

139. *Extension and advisory work.*—The department sustained the concentrated drive aimed at improving the handling of fruit by producers, truckers and loaders. This was best achieved by arranging for the Banana Officer and almost the entire district extension staff to work on bananas throughout the day on which fruit is cut for shipment. This precaution is considered essential to guarantee export of high quality.

PLANT PROTECTION.

140. The expansion of the Plant Protection Scheme to include the Banana Leaf Spot Control Programme, has undoubtly done much within the past three years to make farmers more concious of the need for plant protection.

141. *Disease and pest control.*—Banana Leaf Spot.—(Mycosphaerella musicola). This year a total of 124,007 acres were sprayed using 50,952 gallons orchard oil, 4,838 lbs Perenox and 5,163 lbs. copper oxychloride.

142. This represents 9.8 cycles per acre on the average registered acreage during the year under review. A 21 day spraying cycle was maintained in most areas and during the wet season this was reduced to a 15 day cycle in all areas that are specially susceptible to leaf spot.

143. As a whole control was quite efficient in the lower coastal areas but proved to be a difficult task in the humid, elevated regions, where infection remained medium to high for most of the wet season.

144. *Panama Disease.*—(Fusarium oxysporum v. small foot (Cubense Banana). This disease is still prevalent on many estates where Gros Michel is grown. As there is no established cure it is the policy of this department to encourage planters to replace the Gros Michel by the resistant Lacatan strain, and many farmers have been doing so during the year.

145. *Banana Borer.*—(Cosmopolites sordidus). The use of Aldrin both as a dust and spray on new and existing fields has resulted in a greatly reduced incidence of this pest. Its control really presents no problem. It is of interest to note that this pest cannot fly, so that a fair amount of control can be had by simple *crop rotation.*

146. *Witches' Broom of Cocoa.*—(Marasmus perniciosus). Some 43,219 acres were traversed and in the process 33,770 trees were pruned in an effort to control Witches' Broom.

147. *Cocoa Thrips.*—(Selenothrips rubrocinctus). Using Dieldrin in combination with either Albolineum or Agral, a total of 1,504 acres were sprayed to control this pest.

148. *Cocoa Beetles.*—(Steirastoma breve). This pest gave little or no trouble this year, a fact which is attributed, at least partially, to periodic spraying of interplanted fields with orchard oil for Banana Leaf Spot Control. There is no scientific evidence for this belief, but it is a feature which might be well worth investigation.

149. *Sugarcane Froghopper.*—(Aeneolamia varia). Approximately 329 acres were sprayed with Dieldrin or Dieldrin/Aldrin for control of this pest, and on the whole control was good.

150. *Moth Borers.*—(Diatraea spp).—In 1957 a survey of moth borer damage showed an average joint infestation of 10.6 percent with a range of 3.3 to 15.2 percent. It is proposed to carry out a survey early in 1959, to determine the intensity of infestation which from preliminary observations, is expected to be somewhat higher. Investigations indicate the need for vigorous control measures especially if we bear in mind the fact that for every one percent of joints bored 0.3 percent sugar is lost.

151. *Love Vine.*—This year a sum of $612.94 was spent to control this parasite on government properities throughout the island, and a number of notices were issued to private individuals for control of same. A trial aimed at controlling the parasite on economic plants was laid down in the Westerhall Area. Three different materials at varying concentrations were used but all showed adverse effects on the host plant. These trials will continue next year and it is hoped that better results will be obtained.

152. *Rodents.*—There have been many reports of damage to various economic crops by rats. Sugarcane has been badly damaged and a number of coconut trees in the Paradise (St. Andrew) area has been partially defoliated.

153. *Weed Control.*—Two observation trials were laid down during the latter part of the year:—

(*a*) To examine the possibility of controlling dicotyledonous species in pastures, and

(*b*) To control both dicot—and monocot—species in paths.

These trials need to be continued. Indications are that both measures may prove economic.

LAND USE.

154. *Scope of land use work.*—The Land Use Didvision, which is the nucleus of a future Soil and Chemistry Division, attempts to accumulate and disseminate data on the geological, physical, chemical and cultural characteristics of the soils of Grenada and Carriacou. Currently work is limited largerly to land capability mapping and farm planning. Progress in the future will be curtailed by the lack of a chemistry laboratory for leaf and soil analyses.

155. *Preparation of Maps, Land capability and Farm planning.*—Visits were made to small holdings and advice was given on the most efficient use of the soils on the farms. On request, farm plans were prepared to support verbal recommendations. Small farms were visited in the following areas:

Vincennes
Apres Tout
Thebaide
Tabor,
Champfleur
LaSagesse River Source
Mt. Dor,
Boca,
Morne Jaloux.
Chadeau
Mt. Granby Land Settlement
Conference
Calivigny
Woodlands
Springs
Belmont
LaBorie.

156. During the year land capability and land use mapping of estates continued. By 31st December, large scale maps had been completed for the following estates:

Northern District

1. Hazeldean,
2. Mt. Alexander,
3. Samaritan,
4. St. Leonards.

Eastern District

14. Carriere,
15. Grand Bacolet,
16. Hope.

Southern District

5. Bardia,
6. Bel Isle,
7. Bonacord,
8. Corinth,
9. LaPastora,
10. Laura,
11. Minorca.
12. Morne Delice,
13. Providence

Western District

17. Annandale,
18. Black Bay,
19. Dougaldston,
20. Grenville Vale,
21. L'Assurance (Plaisance),
22. Mt. Nesbit,
23. Mt. Granby,
24. Palmiste,
25. Perseverance,
26. Woodford.

Maps have also been prepared for Mt. Moritz Agricultural Station and Westerhall Livestock Station. All the above maps are prepared in triplicate—one for the farmer, one for the Agricultural Assistant for the District and one for filing.

157. The Land Use Officer prepared a soil association map of Grenada based on data from the 1956-1957 soil survey. In addition, the Land Use Division has voluntarily undertaken the preparation of maps other than soil maps. Copies of the following were made and released within the Department.

(i) Map showing organization of the Grenada Agricultural Extension Service, 1958.
(ii) Annual Rainfall Map of Grenada based on a rainfall map supplied by the B.W.I. Meteorological Service, Trinidad.
(iii) Large scale road and place-name map of Carriacou.
(iv) One large scale photo-mosaic of Carriacou.

LAND SETTLEMENT.

158. There are fourteen (14) Land Settlements in Grenada with a total of 1,880 acres. During the year, ten settlers completed payments on lots, and were granted indentures. Eight transfers were made as a result of deaths, illness or old age.

159. Funds made available for maintenance of existing roads were inadequate and only minor repairs were possible.

160. *Production.*—Bananas, cocoa, nutmeg, coconuts, bluggoes and ground provisions are the main crops grown. Records of yield of export crops on six settlements show an encouraging increase over production in previous years. All indications point to livestock maintaining an important economic role on land settlements.

161. The Butter-making Plant at River Sallee financed by C.D. & W. funds was abandoned as a failure. Causes of the failure were :

(*a*) Butterfat content of milk supplied was very low.

(*b*) Price demanded for milk was high.

(*c*) No market could be found for the skim milk by-product.

162. *Agricultural Small Tenancies Ordinance* (*No.* 17 *of* 1952).—The Land Settlement Officer, under the Agricultural Small Tenancies Ordinance, continued to serve as arbitrator in disputes between landlord and tenant to determine the amount of compensation payable on the termination of tenancy.

163. *Crown Lands.*—Government became increasingly concerned over the lack of a comprehensive plan for the proper control and disposal of crown lands. Presently, numerous government agencies administer control of public lands with no clear-cut division of responsibility for handling all government lands. By year's end all applications for public lands had to be submitted through the Land Settlement Officer.

164. *House and Garden Settlements.*—Late in the year the Government of Grenada launched a scheme to settle tenants ejected from estates on ¼ acre house and garden lots on settlements acquired expressly for the purpose. As the project is for farmers of very limited means, government arranged to accept a minimum deposit of only $20.00 on each lot with terms of repayment extending over fifteen years.

LIVESTOCK.

165. *Artificial Insemination.*—During the year a total of 395 animals were inseminated of which 290 were first services and 105 were repeats. Semen is obtained from a Jersey bull, one graded Jersey bull, one Nelthrop bull and one Red Poll bull, all from the government's bull-barn at Westerhall Station.

Area Distribution of Services.

Parish	No. of Inseminations
St. George	127
St. David	164
St. Andrew	36
St. Patrick	30
St. Mark	32
St. John	6
Total	395

The above figures indicate the obvious popularity of the scheme in the two southern parishes—St. George and St. David. Efforts are being made to popularize the service in the other parishes.

166. *Veterinary.*—The Post of Veterinary Officer was vacant from April to end of July. Presented below is a list of cases treated by the Veterinary Officer and the Veterinary Assistant for the six-month period, August 1958, to January, 1959.

Condition	No. of Animals
Actinomycosis	10
Anorexia	15
Impaction	14
Milk Fever and Ketosis ..	15
Mastitis	25
Pneumonia	10
Piroplasmosis	13
Rabies	9
Surgery	80

In addition, a number of animals were treated for tetanus, contagious abortion and retained placentas.

167. *Enforcement of Ordinance No.* 9 *of* 1953—*Animals* (*Diseases and Importation*).—Certain business firms, despite prior warning, continued to violate Ordinance No. 9 of 1953—Animals (Diseases and Importation) covering the importation of meats and it was necessary to prosecute violators.

FORESTRY.

168. *Lumber.*—The Forest Surveyor continued with the survey of the Grand Etang Reserve during the year. Good progress has been made with this work, the southern section of the Grand Etang Reserve lying south of St. George's/Grenville main road was completed by the middle of the year and a start made with the northern section. At the close of the year about ⅓ of this area was traversed, guide trenches dug, and beacons erected. A total of 878.39 chains (Gunther's) was completed for the year.

169. *Communications and Buildings.*—The Grand Etang main road was kept in reasonable repair but other roads leading to forest areas were again neglected and deteriorated considerably.

170. An arcon shed measuring 50 ft. x 50ft. was erected at the Timber Development Centre, Queen's Park, for housing woodworking machinery.

171. *Protection.*—About twenty-five miles of boundary lines were cleared. Fifteen forest offences were reported and in all but one instance offenders were fined.

172. *Silviculture.*—A total of 49,501 seedlings were raised on the nurseries of St. Margaret, Mirabeau, Les Avocats and Queen's Park. The majority of the seedlings was Blue Mahoe.

Blue Mahoe	46,435
Teak	3,026
Eucalyptus	40
	49,501

Seedlings were distributed as follows :

Grand Etang Forest Reserve	41,664
Distributed to Farmers ..	7,537
Culls	300
	49,501

173. Seedlings were used primarily in the planting of twenty-three (23) acres of Blue Mahoe at Soulier and Les Avocats. Establishment cost was approximately $70.00 per acre. Additional forest nurseries were established and 55,000 seedlings should be available for planting during 1959.

174. Routine maintenance operations were carried out on mahoe and teak plots established in previous years. The only natural regeneration work was the thinning of mahogony and cedar in the Botanic Gardens/Richmond Hill area. This plot is now well established.

FISHERIES.

175. During 1958, six (6) powered boats were built complete with sails, etc., and delivered to the owners, all of whom had been trained to operate engines and effect minor repairs. Other fishermen with encouragement, are in the process of constructing larger boats to be fitted with engines irrespective of whether or not they are granted loans.

SECTION IV.

CARRIACOU.

176. *Weather.*—Rainfall data given below shows 1958 to be a drier-than-normal year. Precipitation was definitely below that needed in the tropics for economic agricultural production in the absence of artificial irrigation.

Station	1958	5 Year Average
Dumfries ..	34.44	43.38
Limlair ..	37.15	45.18
Belair Park ..	46.13	50.07

Agricultural Production.

Crops.

177. *Cotton.*—The table below gives cotton and cotton seed exported for the period 1953 to 1958 inclusive.

Year	Cotton. (Cwts)	Cotton Seeds (Tons)
1953 ..	1,771	237.0
1954 ..	1,182	183.7
1955 ..	1,093	174.5
1956 ..	780	116.6
1957 ..	967	150.6
1958 ..	1,075	168.9

The ginnery paid 12 cents per pound for seed cotton in 1958 as compared with 9 cents in 1957.

178. *Limes.*—No reliable production figures for limes are available but farmers reported the crop to be the best since 'Janet'. A total of 1,080 lbs of lime oil was manufactured at Dumfries and Craigston factories as compared with a total of 540 lbs in 1957. The quantity and value of limeoil exported from Carriacou is given below for the period 1954 to 1958.

	Lime Oil (Lbs.)			Value. ($)	
Year	Dumfries	Craigston	Total	per lb.	Total
1954 ..	630	1,845	2,475	9.00	22,275
1955 ..	256	720	976	6.54	6,383
1956 ..	—	—	—	—	—
1957 ..	360	180	540	10.80	5,832
1958 ..	630	450	1,080	11.52	12,441

179. *Coconuts.*—The small coconut crop was consumed locally. However, this crop has demonstrated its capacity to cope with conditions in Carriacou and some expansion is underway.

180. *Peanuts.*—A small crop of inferior quality peanuts was obtained. New varieties are bing imported and ad hoc fertilizer trials will be established in an effort to improve the quantity of the crop.

Foodcrops

181. *Corn.*—A fair crop of early corn was obtained but most of the later crop was destroyed by the corn leaf worm.

Pigeon Peas.—The pea crop was very disappointing largely as a result of the drought and high winds.

Yams.—The yam crop was poor.

Sweet Potatoes.—The first potato crop was small due to a shortage of planting material; the late crop to be harvested in 1959 was somewhat bigger.

Cassava.—The cassave crop was quite successful and it is hoped that more extensive plantings will be made in future years.

Livestock.

182. Sales of livestock on the Grenada market at Grenville improved during 1958—until then, most of the animals exported were destined for Martinique. Most of the poultry goes to Trinidad. The table below gives the quantity and value of livestock exports for 1956 to 1958.

Year	Cattle	Sheep	Goats	Fowls	Turtles	Total Value
						$
1956 ..	331	291	208	4,268	Nil	39,400
1957 ..	210	187	139	7,070	Nil	29,400
1958 ..	189	167	116	8,785	79	29,200

The table shows the number of cattle, sheep and goats exported to be declining steadily.

WORK IN THE DEPARTMENT.

Extension Service.

183. During the year officers made a total of 3,020 visits to farmers. Advice and demonstrations were given on planting, spraying of disease affected plants, and other cultural practices. As a matter of routine, staff of the department encouraged the adoption of approved soil conservation measures. There is growing interest in the Farmers' Club Movement. Regular monthly club meetings were held and there often precipitated creditable efforts.

184. A wide assortment of planting material was distributed to farmers :

Limes	10,492
Citrus other than limes ..	1,073
Mango	48
Coconuts : Tall	1,846
Dwarf	500
Breadnuts	1,911
Avocado Pears	60
Akee	100
Total ..	16,030

Mortality, however, was high as a result of droughty conditions.

LIMLAIR AGRICULTURAL STATION.

Crops.

185. Small plots of corn, peanuts, cotton, alloes and yams were grown on the station.

Pastures.

186. Three plots of elephant grass were replanted. One acre of pangola grass was established but has made very little progress due to lack of rain.

Livestock.

187. A stud centre is maintained including 2 bulls, 2 rams one jack donkey and a boar; there are also two cows and a poultry flock on the station. A shortage of feed forced the release of 2 bulls, and 2 bull calves, two rams and one ewe. The remaining animals were maintained in good health. Hereunder are the details of services during the year :—

Bulls	127
Ram	1
Boar	39

Births and Deaths and egg statics are given below :

Births : Calves	..	2
Lambs	..	6
Deaths : Lambs	..	1
Poultry	..	9

Egg Statitics :

Collected during the year	..	1,942
On hand from last year	..	33
Total ..	..	1,975
Sales (Table)	..	1,728
do (Hatching)	..	235
Broken	..	2
Carried forward to 1959	..	10
Total	..	1,975

Experiments.

188. Five imported varieties of Sea Island Cotton (V 135, VH 10, VH 8, BS1, and MSI) were used in establishing two 5 x 5 Latin Square trials to be reaped in 1959. Yields and other experimental data will be sent to the Cotton Officer, Antigua, for analysis.

189. Two ad hoc trials were carreid out on yams. Mulched yam significantly out yielded unmulched and staked yam outyielded unstaked.

SECTION V.

Visitors.

His Excellency the Governor Sir Colville M. Deverell and Lady Deverell,
His Honour the Administrartor Mr. J. M. Lloyd,
Honourable H. A. Blaize, Minister for Trade and Production,
Honourable R. K. Douglas, Minister for Communications and Works,
Honourable F. C. Noel, Minister for Social Services,
Barnes, A. S. L., Federal Forestry Adviser,
Biggs, Major H. C., Federal Marketing Adviser,
Bowman, V. V., U.S.O.M.,
Breeze, M. H., Entomologist, Regional Research Centre, Trinidad,
Cadet, C., Agricultural Officer, Research, St. Lucia,
Cope, F. W., Senior Plant Breeder, Regional Research Centre, Trinidad,
Curry, D. G., V.S.O.M., (Cuba),
Fraser, H., Conservator of Forest for the Windward Islands,
Gallant, M. N., Forestry Expert F.A.O.
Gayle, N., Jamaica Agricultural Society,
Harrison, Dr. J. M., Department of Geology, Ottawa,
Hartline, J. R., U.S.O.M.
Hodnett, G. E., Statisticain, I.C.T.A.,
Hutchings, C., Chairman, Co-ordinated Extension Service, Jamaica,
Laidig, D. R., I.C.A., Representative, Eastern Caribbean,
Leach, R., Director of Research, Banana Board, Jamaica,
Leahey, Dr. A., Department of Agriculture, Ottawa,
Maliphant, Dr. G. K., Senior Soil Chemist, Regional Research Centre, Trinidad,
Marshall, R. S., Advisor on Animal Health, Colonial Officer,
Nethersole, H. G., Jamaica Banana Insurance Scheme,
Osbourne, R. E., Chief Agronomist, Ministry of Agriculture, Jamaica,
Simmonds, Dr. N. W., Senior Cytogeneticist, Regional Research Centre, Trinidad,
Spence, J., Plant Pathologist, Ministry of Agriculture, Trinidad.
Spence, J. K. Cotton Officer, Antigua,
Westerman, Dr. J. H., Surinam,
Woodward, W. B., Department of Industrial and Scientific Research, U.K.,
Wright, C., Senior Soil Surveyor, New Zealand.

SECTION VI.

STAFF OF THE DEPARTMENT OF AGRICULTURE.

Technical Staff.

C. A. Southwell, D.I.C.T.A.	Superintendent of Agriculture (Ag.)
W. O'Brian Donovon, Dip., Agric., (O.A.C)	Agricultural Officer (Ag.)

AGRICULTURAL DISTRICTS, GRENADA.

North.

G. A. Phillips, Dip., Agric., (O.A.C).	Agricultural Assistant.
R. Arthur	Junior Agricultural Instructor.
O. Charles	,, ,,
C. Garrett	,, ,,
L. Grenade	,, ,,
K. Shears	,, ,,
F. Wellington	,, ,,

South.

K. I. Rush, Dip. E.C.F.I.	Agricultural Assistant.
C. Alexander	Junior Agricultural Instructor.
C. D. Augustine	,, ,,
N. S. Knight	,, ,,
J. Marrast	,, ,,
H. A. Regis	,, ,,
N. Stevenson	,, ,,

East.

G. Ogilvie, Dip., E.C.F.I.	Agricultural Assistant until April.
W. E. Bain	Agricultural Assistant from July.
E. Calliste	Junior Agricultural Instructor.
H. Hannibal	,, ,,
M. John, Dip., E.C.F.I.	,, ,,
S. Joseph	,, ,,
R. Mark, Dip., E.C.F.I.	,, ,,
C. Mitchell	,, ,,
R. Noel	,, ,,
J. Telesford	,, ,,
C. Pierre	Acting Junior Agricultural Instructor.
C. Rennie	Acting Junior Agricultural Instructor till May.

West.

E. O. Barrett	Agricultural Assistant.
O. Campbell	Junior Agricultural Instructor.
D. Hosten	,, ,,
S. D. C. Law,	,, ,,
M. A. Wilson	,, ,,

Carriacou.

A. C. Branch, Dip., E.C.F.I.	Senior Agricultural Assistant.
L. M. Christopher, Dip., E.C.F.I.	,, Instructor
R. Clara	Junior Agricultural Instructor.
L. C. Sayers	,, ,,

Cocoa Industry Improvement Scheme.

D. A. Perryman, D.I.C.T.A.,	Cocoa Agronomist.
A. M. Cruickshank, D.I.C.T.A.	Agricultural Officer.
N. D. Nedd, Dip. E.C.F.I.	Agricultural Assistant, Officer-in-Charge Maran Cocoa Estate.
B. A. Pitt, Dip., E.C.F.I.	Senior Agricultural Instructor.
R. F. Edwards, Dip. E.C.F.I.	Senior Agricultural Instructor, Acting Officer-in-Charge, Ashenden Cocoa Station.
D. Fletcher	Field Assistant, Officer-in-Charge, Boulogne Propagation Station.
R. L. Benjamin	Field Assistant.
J. Marshall	Foreman, Maran Cocoa Station
R. Honore	Foreman, Ashenden Cocoa Station.
O. Lycorish	Junior Field Assistant.
M. Peters	Junior Field Assistant.
P. Francis	Porpagation Attendant, Boulogne Station.
R. George	Propagation Attendant, Ashenden Station.
O. Benjamin	Propagation Attendant, Maran Station.

Hurricane Recovery Nursery Scheme.

I. Ferreira	Senior Field Assistant, Officer-in-Charge Mirabeau Station.
R. E. Gittens	Works Overseer.
O. John	Field Assistant.
E. Evans	Mechanic.

Plant Protection.

R. E. Pierre, D.I.C.T.A.	Plant Protection Officer, (Ag.).
L. Raeburn	Senior Plant Disease Inspector.
B. Hamilton	" "
B. Calliste	Plant Disease Inspector.
C. Campbell	" "
A. Fletcher	" "
S. Kent	" "
A. LaTouche	" "
J. A. Leid	" "
R. Pierre	" "
D. O. E. Rennie	" "
W. Sawney	" "
F. Haynes	Chief Mechanic.

Veterinary.

E. C. Arthur, B.Sc., D.V.M., V.S.,	Veterinary Officer.
A. S. N. Gittens	Veterinary Assistant.

Livestock.

E. John, Dip., Agric., (O.A.C.)	Livestock Officer.

Bananas.

E. S. Holgate	Banana Officer.

Cane.

L. D. G. Cromwell	Land Settlement Officer to July, Cane Farming Officer from August.

Land Use

E. Payne, B.S.A.	Land Use Officer.
C. Francis	Land Use Assistant.

Fisheries.

C. Grubbe	Fishery Officer.
N. Greaves	Fisheries Assistant.

Land Settlement.

D. K. Samuels	Land Settlement Officer, from August.
E. Lessy	Land Settlement Ranger (Grenada)
E. J. Peters	" "
C. Phillips	" "
C. Welsh	" "
L. Noel	Land Settlement Ranger (Carriacou)
L. Paterson	" "
A. Sydney	" "

Forestry.

J. S. Ross	Forest Supervisor.
T. A. Laldee	Forest Ranger (North) on study leave.
N. Bain	Acting Forest Ranger (North)
J. W. E. Lewis	Forest Ranger (South).
R. Millet	Forest Surveyor.
W. Garraway	Senior Forest Guard
S. Daniel	Forest Guard.
L. Greaves	" "
V. Honore	" "
L. Laldee	" "
A. Lewis	" "

Agricultural Stations.

J. E. Carter	Foreman, Westerhall Agri., Station.
O. Knight	Foreman, Mt. Moritz Agric., Station
L. Whiteman	Act., Foreman, Tivoli Agric., Station.

Clerical., (31st December), Head Office.

C. V. Strachan	Office Superintendent (Acting).
R. Cox	Class II Clerk.
C. Lowe	Class III Clerk.
S. Lord	,,
N. Stevenson	,,
P. Hoyte	,,
M. Haywood	,,
R. Steele	,,

Out Offices-Cocoa Industry Improvement Scheme.

E. N. Barriteau	Class II Clerk.
N. Ceasar	Class III Cerk
R. S. Edwards	,,
B. Grant	,,
K. J. Nedd	,,
N. S. Taylor	,,
H. Williamson	,,

Agricultural Stations.

H. John	Clerical Assistant.
C. Hope	,,
M. Briggs	,,
R. Roberts	,,

APPENDIX I. MONTHLY AND ANNUAL RAINFALL RETURNS—1958.

No.	OBSERVATION STATION.	January	February	March	April	May	June	July	August	September	October	November	December	Total	Maximum in one day and date		No. of days on which rain fell
		Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins.	Ins	Ins.	Ins.	Ins.	Ins.	Ins.	Date.	Ins.	
1	Annandale Station ...	5·23	...	1·02	3·14	13·15	8·20	16·18	12·34	9.13	11·48	10.09	10.09	...	Sept. 12th	4·30	
2	Ashenden Cocoa Station ...	7·69	4·95	·81	3·46	13·15	11·98	20·22	9·27	5.83	9·83	11·71	7·93	106·85	June 18th	3·56	253
3	Baillies Bacolet ...	4·09	1·60	·34	1·15	8·58	9·94	12·98	5·32	2·95	8·64	6·57	4·12	66.28	Oct. 27th	3·70	152
4	Balthazar Estate ...	6·42	1·67	·55	2·70	13·10	9·85	11·59	8·20	4·54	13·43	17·93	6.75	96·73	Nov. 7th	7·02	113
5	Belvidere Estate ...	9·33	2·05	1·90	2·08	17·59	14·71	13.83	12·18	9·02	17·13	20.21	9.51	129·54	Nov. 7th	7·19	165
6	Blair Athol Estate ...	3·19	1·35	1·08	2·49	13·44	9·89	12·26	4.52	5·09	9·34	15·46	6·27	85·38	Nov. 8th	10·35	185
7	Botanic Gardens ...	4·13	1·54	·32	1·13	9·54	7·74	12·54	4·88	4·89	8·83	10·54	5·46	72·66	Dec. 27th	3·25	161
8	Boulogne Nurseries ...	5·19	1·51	·65	2·31	8·89	12·73	11·71	7.08	3·10	11·65	10·78	5.34	81·03	Oct. 9th	2·25	207
9	Brothers Estate ...	5·17	2·25	1·33	2·87	10·94	10·74	17·94	9·10	8·88	8·89	12·78	7·61	108·50	May 3rd	3·80	243
10	Calivigny Estate ...	3·35	1·32	·26	·72	7·21	8·09	12·39	5·20	2·65	8·99	5·98	4·99	61.15	Oct. 2nd	3·40	138
11	Calliste Estate ...	2·11	·52	·07	1·31	4·39	4·83	8.93	2·79	1·79	3·79	2·89	3·14	36·56	Oct. 28th	1·69	184
12	Carriere Estate ...	...	...	...	1·93	8·73	14 51	11·99	6.12	3·05	7·91	9·87	2·25	...	June 18th	2·79	
13	Crayfish Estate (Non-Pariel) ...	4·13	1·26	·99	2.61	10·35	11·30	12·77	9.22	4·16	2·75	12·79	5·75	88·08	Nov. 7th	3·67	228
14	Dougaldston Estate ...	4·34	1·60	1·00	3·63	11·25	10·80	17.69	9.41	8.98	19·14	11·11	8·08	107·03	Oct. 1st	5·53	232
15	Dunfermline Estate ...	4·57	·96	...	1·56	10·95	10.59	14·08	6.36	2·14	9·97	9·03	4·24	...	May 4th	3·80	
16	Grand Bacolet Estate ...	5·91	3.38	·98	4·59	14·55	13·71	17·72	8·96	4·30	9·88	11.36	8·24	95·34	June 17th	3·77	214
17	Grand Etang House ...	16·59	6 96	2·55	4·03	15·31	19·34	25·81	16·77	8·50	15·77	20·45	16·02	168·72	Nov. 8th	3·39	321
18	Hope Estate ...	3·28	1·46	·83	2·85	9·75	9·29	12·01	5·59	2·63	8·36	7.40	3·95	67·76	May 2nd	3·63	140
19	Hope Vale Estate ...	4·94	1·94	·20	1·05	8·45	7·26	11·94	5·01	2.90	8·01	7·37	5·68	64·75	Oct. 27th	3·12	137
20	La Sagesse Estate ...	5·39	1·65	·51	1·55	9·10	9·08	13·85	6·02	1·78	9·07	6.12	2·33	66·43	June 18th	2·30	110
21	Les Avocats Water Works ...	8·19	3·36	1·70	3·41	13·42	14·76	19·82	11.08	7.64	12·29	15·19	8·24	119·10	Nov. 8th	4·00	197
22	Lower Marli Estate ...	2·57	1·27	·55	2·38	10·31	8·76	10·54	4·94	3·00	8·89	14·81	4·96	72·98	Nov. 7th	6·72	184
23	Maran Cocoa Station ...	5·02	1·67	·96	3·03	10·08	11·92	17·21	9·52	8·15	18·22	10·24	7·74	103·76	Oct. 1st	5·07	250
24	Mt. Felix Estate ...	11·78	4·63	1·40	3·90	17·45	16·01	19·84	12·50	11·94	19·18	15·40	10·78	14·81	May 4th	4·90	201
25	Mt. Horne Cocoa Station ...	5·44	1·72	·76	2·60	11·26	11·87	13·06	7.12	3·11	11·10	11·49	5·99	85·52	May 2nd	4·00	165
26	Mt. Moritz Agricultural Station ...	5·75	2·01	·15	1·85	8·01	5·87	18·29	10·59	3·66	13·68	7·47	11·61	88·94	July 3rd	4·00	191
27	Nianganfoix Estate ...	6·62	3·10	1·30	...	8·16	9·65	15·75	10·35	8·11	13·20	18·07	7·68	...	July 13th } Aug. 12th }	2·35	
28	Park Estate ...	6·63	2·25	·75	2·30	8·64	10·01	14·66	6.88	5·84	8·62	9·51	5·93	82·02	June 18th	3·73	160
29	Pomme Rose Water Works ...	6·06	2·59	1·10	3.01	11·86	9·59	15·07	8·44	3·27	8·23	8·86	5·49	84·57	June 19th	3·25	202
30	Samaritan Estate ...	3·76	1·42	1·05	2·45	9·36	12·44	13·19	7·67	5·24	11·49	11·67	6·99	87·23	June 30th	2·98	227
31	Tivoli Agricultural Station ...	3·70	1·43	·07	2·06	8·43	11·26	15.54	4·57	2·35	7·81	10·08	4·43	71·79	July 1st	3·33	152
32	Turfton Hall Estate ...	8·32	3·11	1·43	3·94	14·15	14·81	19·07	8·70	7·64	16·63	14·93	8·98	121·71	Nov. 7th	4·04	185
33	Upper Marli Estate ...	3·41	2·22	·82	2·59	12·30	11·72	12·85	6·07	5·02	9·98	15·30	6·16	88·44	Nov. 7th	4·93	230
34	Westerhall Agricultural Station ...	4·12	1·08	·51	1·35	6·92	8·51	12·26	5·70	2·84	8·76	5·89	3·26	61·20	Oct. 27th	3·89	200
35	Woodlands Sugar Factory ...	2·56	1·38	·24	1·03	7·21	6·21	11.21	5·21	5·48	7·92	5·64	3·88	57·97	May 3rd	2·17	215
	CARRIACOU.																
36	Belair Park ...	1·15	·21	·07	2·37	7·81	6·89	11·44	2·98	2·67	4·01	4·70	1·83	46·13	June 22nd	2·22	84
37	Dumfries Estate ...	·05	·37	·08	1·12	3·10	4·57	8·94	2·80	2·11	3·70	5·28	2·32	34·44	May 2nd	2·40	70
38	Limlair Agricultural Station ...	·09	·10	·00	1·52	6·10	6·35	8·47	2·51	2·15	3·44	3·76	1·85	37·15	May 2nd	2·60	81

APPENDIX II.

Table showing both the Rooting and Propagation Efficiency of the Propagators on the Three Cocoa Stations, Other Statistics from which these indices have been computed are also shown.

	Boulogne	Ashenden	Maran	Cumulative Totals 1958	Cumulative Totals 1957
(*a*) Number of cuttings set	325,403	144,864	146,810	617,059	463,388
(*b*) Number of cuttings rooted and placed on storage floors	196,265	76,604	84,950	357,819	261,583
(*c*) Rooting efficiency	60%	53%	58%	58%	56%
(*d*) Number of plants produced during the year	190,065	76,587	83,632	350,284	259,207
(*e*) Number of plants in storage on 1st January, 1958	52,586	27,367	17,042	96,995	148,154
(*f*) Total number of plants in storage during the year	242,651	103,954	100,674	447,279	407,361
(*g*) Total number of failures during the year	24,172	10,610	23,491	50,273	58,230
(*h*) Percent of deaths	10	10	23	13	14
(*i*) Percent of survivals	90	90	77	87	86
(*j*) Number of plants that would have been distributed from total number set	176,638	68,943	65,411	311,302	224,961
(*k*) Propagation efficiency	54%	48%	44%	50%	48%